

# **HAND TOOL HAVING A BENDABLE HOLDING PORTION**

## **BACKGROUND OF THE INVENTION**



### **1. Field of the Invention**

The present invention relates to a hand tool, such as a pair of pliers or  
5 the like, and more particularly to a hand tool, wherein the two holding grips of  
the handle portion have the same bent angle, thereby facilitating the user  
adjusting the included angle between the head portion and the handle portion.

### **2. Description of the Related Art**

A conventional hand tool 50, such as a pair of pliers in accordance  
10 with the prior art shown in Figs. 7 and 8 comprises a head portion 51, and a  
handle portion 54 pivotally mounted on the head portion 51. The head portion  
51 has two jaw portions 52 pivotally connected with each other. The handle  
portion 54 has two holding grips 56 each having an end pivotally mounted on  
an end of a respective one of the two jaw portions 52 of the head portion 51.  
15 Thus, the handle portion 54 can be bent relative to the head portion 51 so as to  
adjust the included angle between the handle portion 54 and the head portion  
51.

However, the two holding grips 56 of the handle portion 54 cannot be  
moved and bent relative to the two jaw portions 52 of the head portion 51  
20 synchronously, so that the included angle between the handle portion 54 and  
the head portion 51 cannot be adjusted easily and rapidly. In addition, the bent  
angles of the two holding grips 56 of the handle portion 54 are adjusted

independently, so that the two holding grips 56 of the handle portion 54 are not aligned with each other easily, thereby decreasing the driving force of the handle portion 54.

### **SUMMARY OF THE INVENTION**

5           The primary objective of the present invention is to provide a hand tool, wherein the two holding grips of the handle portion have the same bent angle, thereby facilitating the user adjusting the included angle between the head portion and the handle portion.

          Another objective of the present invention is to provide a hand tool,  
10       wherein the elastic member is hidden in the mounting tube, so that the elastic member does not directly contact the air to prevent the elastic member from being rusted due to contacting the air.

          A further objective of the present invention is to provide a hand tool, wherein by provision of the mounting tube and the push rod, the two holding  
15       grips of the handle portion can be pivoted relative to the two jaw portions of the head portion synchronously, so that the included angle between the handle portion and the head portion can be adjusted easily and rapidly.

          A further objective of the present invention is to provide a hand tool, wherein when the user unintentionally touches one of the two holding grips of  
20       the handle portion, the two holding grips of the handle portion have the same bent angle by provision of the mounting tube and the push rod, so that the driving force of the handle portion will not be changed.

In accordance with the present invention, there is provided a hand tool, comprising:

a head portion having two jaw portions pivotally connected with each other by a pivot pin;

5 a handle portion pivotally mounted on the head portion and having two holding grips each having a first end pivotally mounted on an end of a respective one of the two jaw portions of the head portion by a positioning pin and a second end formed with a counterbore;

a mounting tube mounted on the second end of a first one of the two  
10 holding grips of the handle portion;

a push rod mounted on the second end of a second one of the two holding grips of the handle portion and slidably mounted in the mounting tube; and

an elastic member mounted in the mounting tube and urged between  
15 the mounting tube and the push rod.

Further benefits and advantages of the present invention will become apparent after a careful reading of the detailed description with appropriate reference to the accompanying drawings.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

20 Fig. 1 is a perspective view of a hand tool in accordance with the preferred embodiment of the present invention;

Fig. 2 is an exploded perspective view of the hand tool as shown in Fig. 1;

Fig. 3 is a top plan partially cross-sectional view of the hand tool as shown in Fig. 1;

5 Fig. 4 is a partially cut-away exploded view of the hand tool as shown in Fig. 3;

Fig. 5 is a schematic operational view of the hand tool as shown in Fig. 3 in use;

10 Fig. 6 is a schematic operational view of the hand tool as shown in Fig. 1 in use;

Fig. 7 is a perspective view of a conventional hand tool in accordance with the prior art; and

Fig. 8 is a schematic operational view of the conventional hand tool as shown in Fig. 7.

15 **DETAILED DESCRIPTION OF THE INVENTION**

Referring to the drawings and initially to Figs. 1-4, a hand tool 10, such as a pair of pliers or the like, in accordance with the preferred embodiment of the present invention comprises a head portion 11, and a handle portion 14 pivotally mounted on the head portion 11.

20 The head portion 11 has two jaw portions 12 pivotally connected with each other by a pivot pin 13.

The handle portion 14 has two holding grips 16 each having a first end pivotally mounted on an end of a respective one of the two jaw portions 12 of the head portion 11 by a positioning pin 15. Thus, the handle portion 14 is pivoted relative to the head portion 11 to adjust the included angle between the handle portion 14 and the head portion 11. Each of the two holding grips 16 of the handle portion 14 has a second end formed with a counterbore 17.

The hand tool 10 further comprises an arc-shaped mounting tube 18 mounted on the second end of a first one of the two holding grips 16 of the handle portion 14, an arc-shaped push rod 20 mounted on the second end of a second one of the two holding grips 16 of the handle portion 14 and slidably mounted in the mounting tube 18, and an elastic member 19 mounted in the mounting tube 18 and urged between the mounting tube 18 and the push rod 20.

Preferably, the mounting tube 18 has an end inserted into the counterbore 17 of the first one of the two holding grips 16 of the handle portion 14, and the push rod 20 has an end inserted into the counterbore 17 of the second one of the two holding grips 16 of the handle portion 14.

As shown in Fig. 4, when not in use, the elastic member 19 exerts an elastic force on the mounting tube 18 and the push rod 20, so that the mounting tube 18 and the push rod 20 are pushed to move outward relative each other to open the two jaw portions 12 of the head portion 11 for use.

As shown in Fig. 5, when in use, a user's one hand exerts a force on the two holding grips 16 of the handle portion 14 to overcome the elastic force of the elastic member 19, so that the mounting tube 18 and the push rod 20 are pushed to move toward each other to compress the elastic member 19 so as to close the two jaw portions 12 of the head portion 11 to clamp a workpiece (not shown).

As shown in Fig. 6, the mounting tube 18 mounted on one of the two holding grips 16 is combined with the push rod 20 mounted on the other one of the two holding grips 16, so that the two holding grips 16 of the handle portion 14 can be moved synchronously. Thus, the two holding grips 16 of the handle portion 14 can be pivoted relative to the two jaw portions 12 of the head portion 11 synchronously.

Accordingly, the elastic member 19 is hidden in the mounting tube 18, so that the elastic member 19 does not directly contact the air to prevent the elastic member 19 from being rusted due to contacting the air.

In addition, by provision of the mounting tube 18 and the push rod 20, the two holding grips 16 of the handle portion 14 can be pivoted relative to the two jaw portions 12 of the head portion 11 synchronously, so that the included angle between the handle portion 14 and the head portion 11 can be adjusted easily and rapidly.

Further, the two holding grips 16 of the handle portion 14 have the same bent angle by provision of the mounting tube 18 and the push rod 20,

thereby enhancing the driving force of the handle portion 14, so that the two jaw portions 12 of the head portion 11 can be used to clamp the workpiece rigidly and stably.

Further, when the user unintentionally touches one of the two  
5 holding grips 16 of the handle portion 14, the two holding grips 16 of the handle portion 14 have the same bent angle by provision of the mounting tube 18 and the push rod 20, so that the driving force of the handle portion 14 will not be changed.

Although the invention has been explained in relation to its preferred  
10 embodiment(s) as mentioned above, it is to be understood that many other possible modifications and variations can be made without departing from the scope of the present invention. It is, therefore, contemplated that the appended claim or claims will cover such modifications and variations that fall within the true scope of the invention.

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